

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
2 June 2005 (02.06.2005)

PCT

(10) International Publication Number
WO 2005/050148 A3

(51) International Patent Classification⁷: **G01J 3/50**

(21) International Application Number:
PCT/US2004/037517

(22) International Filing Date:
9 November 2004 (09.11.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/520,944 18 November 2003 (18.11.2003) US

(71) Applicant (for all designated States except US): **OC-TADEM TECHNOLOGIES** [—/US]; 14 Kehoe Court, Princeton Junction, NJ 08550 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **HE, Fan** [US/US]; 133 Mainsail Drive, Grayslake, IL 60030 (US). **ZHIHAO, Lin** [US/US]; 14 Kehoe Court, Princeton Junction, NJ 08550 (US). **YUE, Yao** [US/US]; 18216 61 Ave. NE., Kenmore WA 98028 (US).

(74) Common Representative: **ZHIHAO, Lin**; 14 Kehoe Court, Princeton Junction, NJ 08550 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

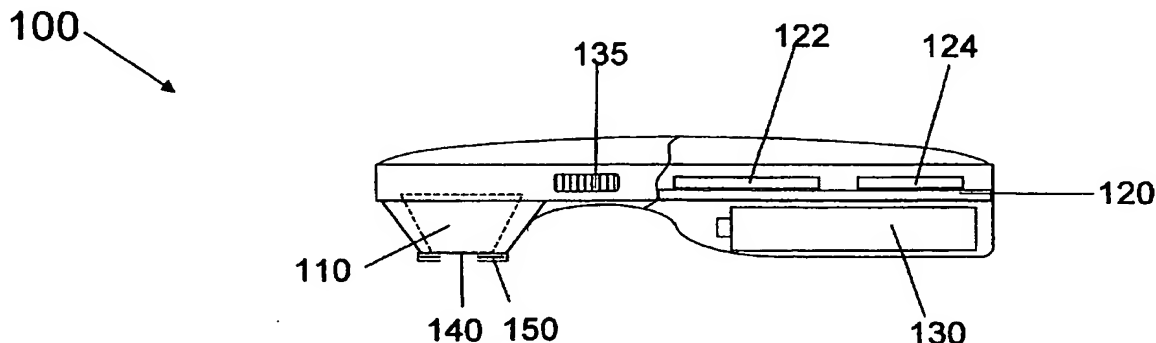
Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:
29 September 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **COMPACT SPECTRAL READERS FOR ACCURATE COLOR DETERMINATION**



(57) Abstract: Systems and methods for providing spectral measurements are described. In one embodiment, a spectral measuring device (100) comprises at least one radiation source configured to provide N ($N \geq 2$) linearly independent illuminant sources (220) characterized by M ($M \geq N$) wavelength channels in a predetermined wavelength range; a sensor unit (240) including at least one sensor, configured to be in optical communication with the radiation sources (220) and an object (280); a memory (124) storing an illuminant characterization matrix including spectral characteristics of the N illuminant sources (220) in the M wavelength channels; and a processor (122) configured to provide spectral responses of the object in the M wavelength channels, based at least in part on the illuminant characterization matrix. The embodiments of the invention can be used to construct a new class of compact spectral measuring devices, such as handheld color measuring devices.